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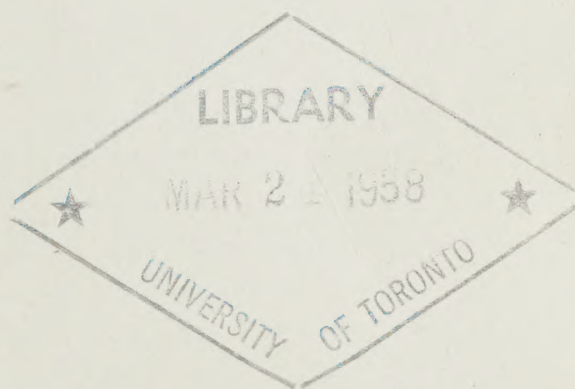
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Publications

CANADIANS STUDYING IN THE UNITED STATES

for degrees in science, engineering,
agriculture, architecture and
veterinary medicine, 1955 - 1956



A professional manpower bulletin

ECONOMICS AND RESEARCH BRANCH
DEPARTMENT OF LABOUR
CANADA

Bulletin No. 3
December 1957

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- No. 1 – Trends in Professional Manpower Supplies and Requirements (August 1957) .*
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CANADIANS STUDYING IN THE UNITED STATES

(Professional Manpower Bulletin No. 3)

E R R A T A

Page 6, para. 2, line 6: for "8 per cent" read "12 per cent".

Page 6, Table 1, last column (Students in U.S. as Proportion of Canadian enrolment): replace existing figures by the following, 12.2; 6.3; 7.3; 7.1; 3.3, total 8.0.

Page 8, Replace the two paragraphs above Table 4 by the following:

"The data in Table 4 confirm this picture. Some of the easternmost provinces, in which the proportion of students per 1,000 college-age population enrolled in Canadian universities is highest in the five fields under review, are also among those with the lowest proportion enrolled in United States universities and colleges. For example, Nova Scotia and New Brunswick have the highest enrolment per 1,000 population of college-age in Canadian universities - 41 and 30.1 respectively; except for Newfoundland and Quebec, they are also the provinces with relatively the lowest enrolment in United States universities and colleges - 0.62 and 0.75 per 1,000 population of college-age respectively. In the western provinces on the other hand, the proportion of students enrolled in United States universities and colleges is comparatively high - 4.17 for Alberta; 2.34 for British Columbia; 1.89 for Manitoba; and 1.73 for Saskatchewan.

Page 8, Table 4. Replace column three (No. per 1,000 Population Aged 18 - 21) by the following:

Newfoundland	7.1
Prince Edward Island	22.5
Nova Scotia	41.0
New Brunswick	30.1
Quebec	19.8
Ontario	21.4
Manitoba	27.9
Saskatchewan	19.3
Alberta	24.7
British Columbia	22.4
CANADA	22.2

CANADIANS STUDYING IN THE UNITED STATES

**for degrees in science, engineering, agriculture,
architecture and veterinary medicine,
1955 - 1956**

Professional Manpower Bulletin No. 3



**ECONOMICS AND RESEARCH BRANCH
DEPARTMENT OF LABOUR
Ottawa, December 1957**

**Hon. Michael Starr
Minister**

**A.H. Brown
Deputy Minister**

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INTRODUCTION

In the academic year 1955-1956, according to the annual census of foreign students in the United States taken by the Institute of International Education in New York, some 4,990 students from Canada were enrolled at degree-granting institutions throughout the U.S.A.

The present Bulletin contains an analysis of information furnished by the Institute at the request of the Department of Labour on the 1,582 of these students (both graduate and undergraduate) who were enrolled in U.S. institutions in the fields of science, engineering, agriculture, architecture and veterinary medicine. Information on students in these five fields was initially requested because they are the ones covered in Register of Personnel in Scientific and Technical Professions maintained by the Department of Labour. Information on all students studying in U.S. colleges and universities was later requested for the academic year 1956-1957, and an analysis of these data will be made as soon as possible.

The census of the Institute of International Education makes no reference to the problem of accreditation as between the various universities and institutions granting degrees in the United States. The relative academic status of many institutions is, therefore, difficult to assess, but it is known that a number of them are not accredited by recognized professional bodies. In the same way, the census makes no distinction between the various departments of a university or degree-granting institution from the standpoint of accreditation.

An attempt is made in this introduction to place in perspective the nearly 1,600 Canadian students in the United States in the five selected fields mentioned above by comparing their enrolment in U.S. institutions with enrolment in the same fields in Canadian universities and colleges and by examining the distribution of graduate and undergraduate students in these fields in both countries. An attempt is also made to relate the distribution of students studying in the U.S. by their province of last residence to the college-age population in the various provinces.

There are many reasons why Canadian students attend U.S. institutions to obtain or complete their higher education. The educational systems in the two countries, for example, are very similar thus making it relatively easy for a Canadian to supplement or complete his education in the United States without duplication or gaps in his or her studies. In addition, there are few barriers in the way of Canadians who wish to enter the United States as students, and for some Canadians, recognized U.S. institutions of higher learning are closer to home than Canadian universities. Furthermore, persons wishing to specialize in certain fields cannot do so at Canadian institutions because the desired courses are not available. Moreover, Canadian employers readily recognize training obtained in U.S. institutions and usually accept graduates from these institutions on the same footing as graduates from Canadian universities and colleges.

For the country as a whole, however, there are a number of disadvantages to the facility of enrolment of Canadian students in U.S. degree-granting institutions. The availability of a wide range of educational facilities "next door" tends to reduce the pressure on the development of Canadian facilities and in fact in certain cases makes such development unwise. The risk of losing Canadian graduates from U.S. institutions to U.S. employers is also great, for in many cases, Canadian employers cannot offer the salaries or opportunities for advancement that U.S. employers can. These disadvantages, however, are national and not individual although their very existence encourages rather than discourages Canadian students from attending U.S. colleges and universities.

Nearly 1,600 Canadians were studying science, engineering, agriculture, architecture or veterinary medicine in U.S. degree-granting institutions in the academic year 1955-1956, compared with about 20,000 in these same fields in Canadian universities and colleges during that academic year. The number studying science in the U.S. (663) represented about 8 per cent of the Canadian enrolment in this field and the number studying engineering about 6 per cent. The higher percentage in the sciences is probably due to the fact that more than half the Canadians studying in this field in the U.S. were graduate students who were probably acquiring specialized training not offered in Canada.

For the same reason, the proportion of graduates among the Canadians studying in the U.S. (36 per cent) was much higher than among the Canadian student body at home (7.1 per cent). If the five fields of study are considered separately, in fact, the proportions are even more striking. In the sciences, almost 55 per cent of the Canadian students in the U.S. were graduates (16.6 per cent in Canada); in engineering 15 per cent were graduates (2.5 per cent in Canada); and in agriculture and architecture 72 and 37 per cent respectively were graduates (13 and 3 per cent in Canada). No figures are available regarding the academic level of veterinary medicine students in either country.

Table 1 - Student Enrolment - Canada and U.S., 1955-1956

	Canadian Enrolment	Canadian Students In U.S.	Students in U.S. as Proportion of Canadian Enrolment (per cent)
Science	5,455	663	8.2
Engineering	12,006	759	6.3
Agriculture	1,466	107	0.7
Architecture	582	41	0.7
Veterinary Medicine	362	12	6.3
Total	19,871	1,582	8.0

Sources: *University and College Enrolment, Fall, 1955*, Dominion Bureau of Statistics; *List of Students Registered in the Graduate Schools of Canadian Universities in Science, Engineering and Medical Sciences, 1955-1956*, National Research Council of Canada.

Table 2 — Student Enrolment — Graduate and Undergraduate
Canada and U.S., 1955–1956

	Undergraduates		Graduates		Graduates as Percent of Total	
	In Canada	Canadians in U.S.	In Canada	Canadians in U.S.	In Canada	Canadians in U.S.
Science	4,548	290	907	364	16.6	54.9
Engineering	11,702	638	304	114	2.5	15.1
Agriculture	1,278	30	188	77	12.8	72.0
Architecture	566	26	16	15	2.5	36.5
Veterinary Medicine	362	*	*	*	*	*
Total	18,456	984	1,415	570	7.1	36.0

*Not available.

Source: See Table 1.

The greatest number of Canadians studying in the U.S. originated from the Province of Ontario (657). Alberta was the province of origin of 267 and Quebec and British Columbia of 167 and 157 respectively. The 657 students from Ontario represented just over 11 per cent of all college and university enrolment in the fields covered in that province; the 267 from Alberta represented about 17 per cent and the 157 from British Columbia about 10 per cent. In Quebec, however, the proportion dropped to 3 per cent.

Table 3 — Enrolment in Canadian Universities and Colleges and
of Canadians in U.S. Institutions, by Province of Last Residence, 1955–1956

	Enrolment in Canadian Universities and Colleges (1)	Canadian Students in U.S. by Province of Last Residence (2)	(2) as a % of (1)
Newfoundland	183	7	3.8
Prince Edward Island	128	5	3.9
Nova Scotia	1,713	26	1.5
New Brunswick	990	25	2.5
Quebec	5,584	167	3.0
Ontario	5,928	657	11.1
Manitoba	1,297	88	6.8
Saskatchewan ¹	970	87	9.0
Alberta	1,581	267	16.9
British Columbia ¹	1,497	157	10.5
Canada	19,871	1,582 ²	8.0

¹ Excluding sciences.

² Including 96 whose province of origin was not stated.

Source: See Table 1.

It should be remembered that Ontario and some of the Western provinces are closer than other parts of Canada to sections of the United States where higher educational institutions abound. Universities just south of the Great Lakes are readily accessible to residents of Ontario and similarly both east and west of the Rockies, many U.S. universities and colleges are as close or closer to Canadian students than

Canadian institutions of higher learning. It should also be remembered, however, that several of the eastern U.S. universities (Harvard, Yale, Princeton) are among the most costly to attend, so that students in eastern Canada, even those residing near these institutions, might not be as likely to enroll there as at Canadian universities in eastern Canada.

Alberta, British Columbia and Ontario, in that order, had the largest proportion of the college-age population (18 to 21 years of age) enrolled at institutions of higher learning in the fields covered in June 1956. In Alberta, nearly 25 persons in every 1,000 of the college-age population were at university in one of the five fields under review; in British Columbia the figure was about 22 in every 1,000, and in Ontario about 21.

Canadians studying in the U.S. followed the same pattern. Four of every 1,000 persons of college-age in Alberta were enrolled in U.S. degree-granting institutions, and British Columbia and Ontario followed with roughly 2 of every 1,000 studying in the U.S.

Table 4 – Number per 1,000 College-Age Population Enrolled at Canadian and U.S. Universities and Colleges in the Fields of Science, Engineering, Agriculture, Architecture, and Veterinary Medicine, 1955–1956

	Estimated Population Aged 18–21 June 1956	Enrolment in Canadian Universities & Colleges 1955–1956	No. per 1,000 Popu- lation Aged 18–21	Canadian Students in U.S. Universities & Colleges	No. per 1,000 Population Aged 18–21
Newfoundland	25,834	183	0.7	7	0.27
Prince Edward Island	5,696	128	2.2	5	0.86
Nova Scotia	41,781	1,713	4.0	26	0.62
New Brunswick.....	32,923	990	3.0	25	0.75
Quebec	282,652	5,584	19.8	167	0.59
Ontario	276,622	5,928	21.4	657	2.37
Manitoba.....	46,408	1,297	2.8	88	1.89
Saskatchewan	50,248	970	19.3	87	1.73
Alberta	63,964	1,581	24.7	267	4.17
British Columbia	66,822	1,497	22.4	157	2.34
Canada	895,110 ¹	19,871	22.2	1,582 ²	1.76

¹ Including 2,160 in Yukon and Northwest Territories.

² Including 96 whose province of origin was not stated.

Source: See Table 1.

The remainder of this Bulletin contains information on the age, the academic level, the province of origin, the sources of support and the institutions of enrolment of the Canadian students in U.S. degree-granting institutions in the fields of natural and physical sciences, engineering, agriculture, architecture, and veterinary medicine in the academic year 1955–1956.

NATURAL AND PHYSICAL SCIENCES

A total of 663 Canadians were studying the natural and physical sciences in U.S. degree-granting institutions in the academic year 1955-1956. Most of these were studying chemistry and geo-science, which each accounted for 140 students.

All the Canadian provinces were represented, Ontario, however, contributing more than one-third of the total. Alberta and British Columbia accounted for the next largest groups. More than half the students were graduates and all but 28 were men.

About half of the Canadian students were self-supporting and about one-quarter were wholly financed by private organisations. It is interesting to note that more graduates than undergraduates were supported by private organisations.

Altogether some 143 different universities and degree-granting institutions were attended by Canadian students in the natural and physical sciences. Twenty-one universities and colleges with a large Canadian attendance are listed in Table 9 on page 13.

Astronomy

Four Canadian students were taking courses in astronomy at three different universities in the United States during the academic year under consideration. All were graduates, and ranged in age from 28 to 30. The three institutions attended were the University of Michigan, Harvard University, and Ohio State University.

Biological Sciences, Biology, and Botany

These three specializations, which are shown separately in the Tables, are here discussed as a group. During 1955-1956, Canadians studying biological science, biology, and botany in the United States numbered 186. Just under one-third came from Ontario and just under one-fifth from British Columbia.

Rather more than half of the group, or 114 students, were graduates. Only 14 of the 186 were women. Although there was a fairly wide variation in the ages of the students, the greatest concentration was at the 24 year old level. Some 16 per cent of the group, or 30 students, however, were 30 years of age or over.

More students in the biological sciences, biology and botany were self-supporting than were supported by private organisations. Of the 54 students supported by private organisations, only four were undergraduates.

The largest single group enrolment of Canadian students in these sciences was at the University of Wisconsin, where 19 students were registered. Next in order of numerical importance was Walla Walla College, Washington, with 11 students, and Cornell University, the University of Minnesota and the University of Michigan, with ten students each. Other institutions attended were Montana State College, with eight, and the University of California, with seven.

Chemistry

A comparatively large group of 140 students from Canada were specializing in chemistry in the United States during 1955–1956. The larger part of the student body consisted of graduates. Only 52 students, in fact, were undergraduates. Of the total number, only five students were women; and the main age groups ranged from 20 to 27.

A considerable proportion of students in chemistry were wholly supported by private organisations, some 51 being in this category. The great majority of these (46) were graduate students. A further group of 16 students received partial financial assistance from private organizations.

Sixty-three different universities and colleges in the United States were attended by the Canadian students in chemistry. The largest collective enrolment was at the University of California, which had 11 Canadian students, followed by the University of Minnesota, with nine, the University of Wisconsin, with seven, and Cornell University with six. Notre Dame University and Walla Walla College, Washington, had five Canadian students each.

Geo-science

The same number of Canadian students, 140, were specializing in geo-science as in chemistry. Most of these students came from Ontario and Alberta, but the other provinces were also fairly well represented. Nearly 60 per cent were undergraduates, and all but two were men. They were mainly between 20 and 25 years of age.

Private organizations supported fewer students in geo-science than in chemistry. Twenty students only were wholly supported by such organizations, although 32 received partial financial assistance. Of the number of students who were wholly supported, 17 were graduates.

Canadian students of geo-science in the United States attended 42 degree-granting institutions of many different kinds. The largest enrolments were at the University of Michigan, the University of North Dakota, and Colorado College, which had 13 Canadian students each. Brigham Young University had ten Canadian students, and Michigan State University of Agriculture and Applied Sciences had nine. Other universities attended by students from Canada in geo-science included the Massachusetts Institute of Technology, with eight, the University of California, with seven, and Princeton University and the University of Washington, with six each.

Mathematics and Statistics

Sixty-six Canadian students specialized in mathematics and statistics at universities and colleges in the United States during the year under review. Almost half of that number (32) came from Ontario. More than half the students (38) were graduates. In this specialization there was only one female student. The ages of the students varied over a fairly wide range, although most were between 22 and 24 years of age.

An interesting characteristic of the mathematics and statistics group is that nearly half the students were supported by private organizations. Twenty-nine students were so supported, and, in addition, 12 received partial financial assistance from private organizations. Of those wholly supported by private organizations, 24 were graduates.

Altogether some 40 degree-granting institutions were attended by Canadians studying mathematics and statistics. Owing to their relatively small number and wide distribution over so many different universities and colleges, very small groups of Canadian students were in attendance at even the most well-known universities. Princeton University and the Massachusetts Institute of Technology, for example, had only six Canadian students each in mathematics and statistics.

Metallurgy

There were only eleven Canadians studying metallurgy in the United States in 1955–1956; eight were graduates. Seven students, all graduates, were wholly maintained by private organizations. The metallurgy students attended five different United States institutions. Seven were taking courses at the Massachusetts Institute of Technology.

Physics

Ninety-one students from Canada were studying physics in universities and colleges throughout the United States in 1955–1956. About one-third came from Ontario. Some 60 per cent of the student body, or 57 students, were graduates. With one exception, the entire group consisted of men. As in other specializations, the ages of the students varied fairly widely, although more students were 23 than any other age.

Twenty-three students, all graduates, were supported entirely by private organizations, while 12 received partial assistance from such bodies.

Forty-four different institutions were attended. The largest group enrolments were at the University of Washington and the University of California, each with seven Canadian students. Other institutions attended by Canadians included the University of Michigan, Columbia University, Cornell University, the De Vrie Technical Institute, and the Massachusetts Institute of Technology.

Science Not Designated

Twenty-five students were studying in undesignated branches of science at degree-granting institutions in the United States. Nineteen of this number were graduates. Only two of the students in these undesignated departments of science were supported entirely by private organizations; one of these was a graduate and the other an undergraduate.

Twenty different degree granting institutions were attended, but in view of the small number of students in this group, and their wide distribution over so many universities and colleges, no one institution had a large enrolment of Canadian students.

Table 5 — Canadians Studying the Natural and Physical Sciences in the United States, 1955–1956, by Province of Last Residence

	Astronomy	Biological Sciences	Biology	Botany	Chemistry	Geo-Science	Mathematics and Statistics	Metal-lurgy	Physics	Science not Designated	Total
Newfoundland	—	1	1	—	—	—	—	—	1	—	3
Prince Edward Island	—	1	1	1	—	—	—	—	—	—	3
New Brunswick	—	3	2	4	1	3	—	—	1	1	15
Nova Scotia	—	—	2	4	6	1	—	1	2	—	16
Quebec	1	2	6	7	14	11	17	—	19	1	78
Ontario	2	17	13	23	46	44	32	4	30	11	222
Manitoba	—	9	5	3	13	18	4	—	1	3	56
Saskatchewan	—	1	7	1	8	10	2	1	8	—	38
Alberta	—	5	6	17	23	39	3	—	17	3	113
British Columbia	1	8	11	17	20	9	6	2	8	6	88
Yukon	—	1	—	—	—	—	—	—	—	—	1
Outside Canada	—	1	—	—	—	2	—	—	1	—	4
Not stated	—	2	3	1	9	3	2	3	3	—	26
Total	4	51	57	78	140	140	66	11	91	25	663

Table 6 — Canadians Studying the Natural and Physical Sciences in the United States, 1955–1956, by Academic Status

	Astronomy	Biological Sciences	Biology	Botany	Chemistry	Geo-Science	Mathematics and Statistics	Metal-lurgy	Physics	Science not Designated	Total
Undergraduates	—	16	22	34	52	80	27	3	30	21	285
Graduates	4	35	35	44	86	58	38	8	57	4	369
Status not stated	—	—	—	—	2	2	1	—	4	—	9
Total	4	51	57	78	140	140	66	11	91	25	663

Table 7 — Canadians Studying the Natural and Physical Sciences in the United States, 1955–1956, by Age

	Astronomy	Biological Sciences	Biology	Botany	Chemistry	Geo- Science	Mathematics and Statistics	Metallurgy	Physics	Science not Designated	Total
Over 30	1	9	9	11	7	5	3	1	9	—	55
30	—	4	2	1	9	3	1	—	4	—	24
29	1	1	1	3	6	4	5	—	2	—	23
28	2	5	5	2	8	5	3	—	6	—	36
27	—	3	3	5	10	5	2	1	7	2	38
26	—	6	4	3	17	9	4	—	10	1	54
25	—	4	6	6	13	20	4	1	5	—	59
24	—	6	5	8	17	14	7	1	7	2	67
23	—	2	4	6	12	16	7	1	14	5	67
22	—	2	3	8	12	20	7	4	9	2	67
21	—	2	—	6	4	12	5	1	2	2	34
20	—	4	3	6	13	18	6	—	5	4	59
19	—	—	5	6	5	3	8	1	8	3	39
18	—	—	3	1	4	4	2	—	2	3	19
17	—	1	—	1	—	—	2	—	—	—	4
Not stated	—	2	4	5	3	2	—	—	1	1	18
Total	4	51	57	78	140	140	66	11	91	25	663

Table 8 — Canadians Studying the Natural and Physical Sciences in the United States, 1955–1956, by Type of Support

Type of Support	Astronomy	Biological Sciences	Biology	Botany	Chemistry	Geog- Science	Mathematics and Statistics	Metallurgy	Physics	Science not Designated	Total
Private organization	1	16	19	19	51	20	29	7	23	2	187
Self	1	26	22	34	56	78	21	4	42	19	303
Private organization plus self	1	4	6	14	16	32	12	—	12	3	100
United States Government	—	—	—	—	3	—	1	—	1	—	5
USG plus self	—	—	1	—	1	—	—	—	—	—	2
USG plus PO	—	—	1	—	2	—	1	—	—	—	4
USG plus PO plus self	—	—	—	—	—	—	—	—	1	—	1
Foreign government	1	3	3	5	—	2	—	—	1	—	15
FG plus self	—	—	—	—	—	—	1	—	—	—	1
FG plus PO	—	1	1	1	1	1	—	—	1	—	6
FG plus PO plus self	—	—	—	—	—	—	1	—	1	—	2
Not stated	—	1	4	5	10	7	—	—	9	1	37
Total	4	51	57	78	140	140	66	11	91	25	663
Graduate students supported entirely by private organizations	1	14	17	19	46	17	24	7	23	1	169
Undergraduates so supported	—	2	2	—	5	3	5	—	—	1	18

Table 9 — U.S. Universities Ranked in Order of Attendance by Canadian Students in the Natural and Physical Sciences 1955–1956, Showing the Particular Specializations Studied

	University of Wisconsin	University of Michigan	University of California	Massachusetts Institute of Technology	University of Washington	University of Minnesota	Cornell University	Princeton University	Brigham Young University	Walla Walla College	Michigan State College of Agriculture and Applied Sciences	Colorado College	University of North Dakota	Harvard University	Montana State University	University of Illinois	Yale University	Notre Dame University	University of Chicago	Michigan State College of Mining and Technology	Wayne University	Canadian Attendance at Other U.S. Universities Each Showing Fewer Than 10 Canadian Students	Total
Astronomy	—	2	—	—	—	—	—	—	—	1	—	—	—	1	—	—	—	—	—	—	—	1	4
Biological sciences	8	4	3	—	1	6	4	—	—	8	—	—	—	—	—	—	3	1	1	—	—	12	51
Biology	5	2	4	1	1	1	—	1	1	3	1	—	—	—	—	3	—	—	—	—	—	33	57
Botany	6	4	—	—	4	3	6	—	—	—	4	—	—	—	8	1	4	—	—	2	1	35	78
Chemistry	7	3	11	4	3	9	6	—	4	5	—	—	—	3	—	3	2	5	1	1	4	69	140
Geo-science	3	13	7	8	6	3	—	6	10	—	9	13	13	4	2	2	1	—	1	5	2	32	140
Mathematics and statistics	2	1	—	6	2	2	2	6	1	2	—	1	—	2	—	1	—	—	2	—	—	36	66
Metallurgy	—	—	—	7	1	—	—	—	—	—	—	—	—	—	—	—	1	1	—	1	—	—	11
Physics	3	4	7	4	7	—	4	6	3	—	1	1	—	3	2	1	—	3	3	1	2	36	91
Science not designated	1	—	—	—	—	—	—	—	—	—	1	—	1	—	—	—	—	—	2	—	—	20	25
Total	35	33	32	30	25	24	22	19	19	18	16	15	14	13	12	11	11	10	10	10	10	274	663

PRE-ENGINEERING

Seventy-four students from Canada studied pre-engineering in the United States in 1955–1956. This is a preparatory course, at the university level for students intending to study engineering. More than two-thirds of the pre-engineering students were from Ontario. All were undergraduates except four; all were male.

Although nearly half these students were under 21 there was, nevertheless, a considerable proportion of older students. For example, about 18 per cent were over 30 years of age, and the range of ages was quite wide for the group as a whole.

Most of the Canadian students in pre-engineering in the United States were self-supporting; only four of the students indicated that their sole support was from a private organization, although five received partial support from such organizations. Three of the students supported by private organizations were undergraduates, one a graduate.

The Canadian students in this group were in 28 different American colleges and universities in the year 1955–1956, although the largest single number, 29 (39 per cent of the group), attended the Chrysler Institute of Engineering. The students were well scattered among the other universities: only Brigham Young University and the University of Idaho had as many as four Canadian students each in pre-engineering; the General Motors Institute had three.

ENGINEERING

Some 759 students from Canada were taking courses in engineering in the United States during the year under review. Mechanical engineering was the largest single specialization, with 181 students, and civil engineering occupied second place with 141 students.

The number of undergraduates was very high. Altogether 84 per cent of the student body, or 638 students, came into this category.

More than half of the student body in engineering originated from the province of Ontario, although large groups also came from Alberta and Quebec.

In age the students varied considerably. Most students, however, as might be expected from their academic level of attainment, were young. The greatest representation fell within the 20-year-old group, but a fairly high number also came within the 19 to 25 age groups.

The engineering students were all men, except one. One female student was studying aeronautical engineering.

Canadian students in engineering were self-supporting to a remarkable degree. Almost three-fourths of the student body were financially independent, many of the remainder receiving assistance either wholly or partly from private organizations.

Some 113 different universities and degree-granting institutions were attended by Canadian students in engineering. Nineteen of the leading American universities accounted for 68 per cent of the Canadian student body. The largest Canadian enrolment was at Michigan College of Mining and Technology, where 78 students were registered, followed by the University of Detroit, which had 70 Canadian students in engineering.

Aeronautical Engineering

Forty-five students from Canada studied aeronautical engineering at universities and degree-granting institutions throughout the United States during the year under review. One-third were from Ontario.

Almost three-fourths of the Canadians studying in the U.S. were undergraduates, and all the students were male, except one. The ages of the students varied considerably, but the majority were between 20 and 24 years of age.

The aeronautical engineering students from Canada were in the main self-supporting, and received no financial assistance.

Altogether 17 different universities and colleges in the United States were attended. Three institutions, the Northrop Aeronautical Institute, the University of Detroit, and the University of Washington, had seven Canadian students each. Other universities and colleges at which Canadian students were enrolled included the University of Michigan, Massachusetts Institute of Technology, and the California Institute of Technology.

Agricultural Engineering

In this branch of engineering only 11 Canadian students were enrolled at universities and colleges in the United States.

All were graduates, and were, in consequence, rather older than some of the other engineering groups. No student was under 25 years of age.

They attended seven universities and degree-granting institutions throughout the United States, chief among which were the Utah State Agricultural College, Iowa State College of Agriculture and Mechanical Arts, and the University of California.

Chemical Engineering

Eighty Canadian students specialized in chemical engineering at United States universities and colleges in the academic year under review. Half came from the Ontario. Over three-fourths were undergraduates and all were male. More students were either 20 or 21 than any other single age, the main group being in the 19 to 25 year old range.

Three-fourths of the students were entirely self-supporting. Eleven students were wholly supported by private organizations, and six received partial support from such organizations.

They attended 31 different universities and colleges in the United States. Michigan College of Mining and Technology had the largest Canadian enrolment, with ten students. The University of Detroit, Brigham Young University, the University of Michigan, and Massachusetts Institute of Technology, each had seven Canadian students.

Civil Engineering

A total of 141 students from Canada specialized in civil engineering at U.S. degree-granting institutions in 1955–1956.

About one-half of this number came from Ontario. The majority were undergraduates; only 24 were graduates. Most of the students were in the 19 to 24 age groups; all except four were men.

Seventy per cent of the total student body, or 101 students, were self-supporting. Thirteen students were wholly supported by private organizations, while 17 received partial support.

Forty-six different universities and colleges were attended, the largest enrolment being at the University of Detroit, with 20 students. The Michigan College of Mining and Technology had the second largest enrolment, with 11 Canadian students, while the University of Illinois occupied third place, with eight students.

Electrical Engineering

Eighty-five Canadian students were taking electrical engineering courses at universities and colleges in the United States during the academic year under review.

The largest provincial representation was from Ontario, which contributed about 45 per cent of the total. The great majority of the students were undergraduates; only about ten per cent were graduates. The entire student body was male. There was a considerable variation in the ages of the students, but the most common age groups were from 19 to 23.

As in civil engineering, the proportion of students who were financially self-supporting was high. Eighty per cent of the students in electrical engineering, in fact, were entirely independent of outside financial aid.

The University of Detroit and the Massachusetts Institute of Technology had the largest group enrolments of the 36 universities and colleges attended. Other institutions with Canadian enrolment include Tri-State College, Michigan College of Mining and Technology, the Detroit Institute of Technology, and Michigan State University of Agriculture and Applied Sciences.

Metallurgical Engineering

Only ten students from Canada were studying metallurgical engineering at universities and other degree-granting institutions in the United States in 1955–1956. Six were undergraduates, and six were entirely self-supporting. Eight different universities and colleges were attended.

Industrial Engineering

Canadian students in industrial engineering courses in the United States in 1955–1956 numbered 28. Ontario was the home province of the great majority, 20 students in all coming from that province.

The entire student body, with two exceptions, consisted of undergraduates. Their ages varied considerably, but the majority, as might be expected in view of their undergraduate status, was between 17 and 22 years of age.

A larger proportion of Canadian students in industrial engineering were supported by private organizations than in other specializations. Nearly 43 per cent of the student body—12 students—were helped in this way. In addition, five students received partial support from private organizations.

Ten different universities and colleges were attended by the Canadian students in industrial engineering. Fifteen studied at The General Motors Institute, while others were registered at the University of Michigan, Georgina Institute of Technology, Rensselaer Institute, and the University of North Dakota.

Mechanical Engineering

In all, 181 students from Canada specialized in mechanical engineering at various universities and degree-granting institutions throughout the United States in 1955–1956. Of the total, 64 per cent, or 116 students, originated from Ontario.

Ninety per cent of the student body were undergraduates, and all the students were men. In age the majority fell within the 19 to 24 age groups, although some were considerably older.

Some 75 per cent of the mechanical engineering students received no financial aid. On the other hand, 20 students were supported by private organizations, and one by a government other than that of the United States. Eighteen students received partial assistance from private organizations.

It is perhaps significant that in the specialization of mechanical engineering more undergraduates than graduates received support from private organizations. In specializations other than mechanical engineering invariably more graduates than undergraduates received financial aid.

Students in mechanical engineering were enrolled at 48 different institutions throughout the United States. By far the largest group (26) attended the University of Detroit, while a second large contingent (22) was at the Michigan College of Mining and Technology. Third in numerical importance was The General Motors Institute, with 19 Canadian students. The Massachusetts Institute of Technology and the University of Michigan had ten students each.

Other institutions attended included The Chrysler Institute of Engineering, Indiana Technical College, Wayne University, Tri-State College, and the Clarkson College of Technology.

Mining Engineering

Twenty-seven Canadian students specialized in mining engineering at universities and colleges in the United States during 1955–1956. All but one were undergraduates, and all were men. Most of the students were entirely self-supporting.

Ten different degree-granting institutions were attended. The largest group (15) was at Michigan College of Mining and Technology.

Petroleum Engineering

Some 60 students from Canada were taking courses of study in petroleum engineering at degree-granting institutions throughout the United States in the year under review. A high proportion originated from the provinces of Ontario and Alberta.

With three exceptions, all the Canadian students in this specialization were undergraduates, and all were men. As might be expected from their undergraduate status, the predominant age groups were in the early twenties. More students, in fact, were aged 20 than any other age.

Approximately two-thirds of the student body were self-supporting. Only four students, one of whom was a graduate, received financial assistance from private organizations. One student was maintained by a government other than that of the United States.

The Michigan College of Mining and Technology had the largest Canadian enrolment, with 14 students, while the University of Oklahoma followed next, with eight. Other institutions attended by Canadian students included the University of North Dakota, Montana School of Mines, and Colorado College. In all, students from Canada were enrolled at 18 different degree-granting institutions.

Sanitary Engineering

Ten Canadian students were studying sanitary engineering in the United States during the year under consideration. Half of them came from the province of Quebec. All students in this specialization were graduates, and all were 23 years of age or over.

Only four were entirely self-supporting. Three students were wholly maintained by private organizations, and two by governments other than that of the United States. Most of the students attended the Massachusetts Institute of Technology.

Textile Engineering

As in sanitary engineering, only a very small number of students from Canada were taking courses in textile engineering at universities and colleges throughout the United States in 1955–1956. In all only seven Canadian students were specializing in textile engineering. Four were from Quebec and all but one were undergraduates.

Most of the Canadian students were self-supporting; only one was wholly supported by a private organization.

Five different institutions were attended, among them the Philadelphia Textile Institute.

Table 10 — Canadians Studying Engineering in the United States, 1955–1956, by Province of Origin

	Pre-engineering	Aeronautical	Agricultural	Chemical	Civil	Electrical	Metallurgical	Industrial	Mechanical	Mining	Petroleum	Sanitary	Textile	Total
Newfoundland	—	—	—	—	—	1	—	—	1	—	—	—	—	2
Prince Edward Island	1	—	—	—	—	—	—	—	—	—	—	—	—	1
New Brunswick	—	1	—	1	3	1	—	1	1	—	1	—	—	9
Nova Scotia	—	2	—	2	—	1	—	—	—	—	—	—	—	5
Quebec	1	7	3	6	7	6	1	1	16	3	6	5	4	66
Ontario	51	15	1	40	68	39	6	20	116	14	19	2	2	393
Manitoba	1	2	—	2	4	4	—	2	3	2	3	1	1	25
Saskatchewan	3	2	4	2	7	4	—	1	11	1	3	1	—	38
Alberta	11	9	—	13	28	13	3	1	10	3	24	—	—	115
British Columbia	3	4	3	4	14	7	—	1	11	4	3	—	—	54
Outside Canada	—	—	—	—	2	—	—	—	—	—	—	—	—	2
Not stated	3	3	—	10	8	9	—	1	12	—	1	1	—	49
Total	74	45	11	80	141	85	10	28	181	27	60	10	7	759

Table 11 — Canadians Studying Engineering in United States Universities, 1955–1956, by Academic Status

	Pre-engineering	Aeronautical	Agricultural	Chemical	Civil	Electrical	Metallurgical	Industrial	Mechanical	Mining	Petroleum	Sanitary	Textile	Total
Undergraduates	70	34	—	62	117	72	6	26	162	26	57	—	6	638
Graduates	4	11	11	18	24	13	2	1	15	1	3	10	1	114
Status not stated	—	—	—	—	—	—	2	1	4	—	—	—	—	7
Total	74	45	11	80	141	85	10	28	181	27	60	10	7	759

Table 12 — Canadians Studying Engineering in the United States, 1955–1956, by Age

Age	Pre-engineering	Aeronautical	Agricultural	Chemical	Civil	Electrical	Metallurgical	Industrial	Mechanical	Mining	Petroleum	Sanitary	Textile	Total
Over 30	13	6	5	4	4	8	1	—	8	—	3	1	—	53
30	1	1	—	1	1	—	—	—	2	—	1	—	—	7
29	1	2	1	2	1	5	—	—	5	1	1	1	—	20
28	1	1	—	4	1	3	—	—	4	—	1	—	—	15
27	—	2	1	2	5	—	—	1	2	—	3	1	—	17
26	2	1	3	3	5	6	1	1	4	2	2	2	1	33
25	4	3	1	6	8	3	—	2	6	3	2	3	1	42
24	2	4	—	6	18	6	—	1	13	4	6	1	1	62
23	2	5	—	6	15	10	2	—	26	3	6	1	—	76
22	5	4	—	7	20	8	2	4	19	2	5	—	2	78
21	3	4	—	11	19	11	2	1	31	6	8	—	—	96
20	9	6	—	13	17	8	1	7	32	4	11	—	—	108
19	16	3	—	7	18	8	1	4	19	1	5	—	1	83
18	6	3	—	3	3	4	—	3	4	1	4	—	1	32
17	—	—	—	2	1	1	—	4	6	—	—	—	—	14
Not stated	9	—	—	3	5	4	—	—	—	—	2	—	—	23
Total	74	45	11	80	141	85	10	28	181	27	60	10	7	759

Table 13 — Canadians Studying Engineering in the United States, 1955–1956, by Type of Support

Type of Support	Pre-engineering	Aeronautical	Agricultural	Chemical	Civil	Electrical	Metallurgical	Industrial	Mechanical	Mining	Petroleum	Sanitary	Textile	Total
Private organization....	4	—	2	11	13	4	—	12	20	2	4	3	1	76
Self	58	32	5	58	101	69	6	11	136	21	43	4	5	549
Private organization plus self	5	7	—	6	17	7	2	5	18	2	10	—	1	80
Foreign government	1	5	2	—	2	1	—	—	1	—	1	2	—	15
FG plus self	—	—	2	—	—	—	—	—	—	—	—	—	—	2
Not stated	6	1	—	5	8	4	2	—	6	2	2	1	—	37
Total	74	45	11	80	141	85	10	28	181	27	60	10	7	759
Graduate students showing support only from private organization	1	—	2	10	10	3	—	10	5	—	1	3	1	46
Undergraduates so supported	3	—	—	1	3	1	—	2	15	2	3	—	—	30

Table 14 — U.S. Universities Ranked in Order of Attendance by Canadian Students in Engineering in 1955–1956,
Showing the Particular Specializations Studied

	Michigan College of Mining and Technology	University of Detroit	Massachusetts Institute of Technology	University of Michigan	Chrysler Institute ¹ of Engineering	General Motors Institute ¹	Brigham Young University	University of North Dakota	Tri-State College	University of Washington	Wayne University	University of Idaho	Michigan State College of Agriculture and Applied Sciences	Clarkson College of Technology	Indiana Technical College	Detroit Institute of Technology	University of Illinois	Colorado College	Rensselaer Polytechnic Institute	Canadian Attendance at Other U.S. Universities, Each Showing Fewer than 10 Canadian Students	Total
Pre-engineering	—	—	—	9	29	3	4	1	—	—	1	4	1	1	—	—	—	1	—	20	74
Aeronautical	—	7	4	5	1	—	—	—	—	7	—	—	—	—	—	—	1	—	1	19	45
Agricultural	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	10	11
Chemical	10	7	7	7	2	—	7	1	1	1	5	1	2	1	2	—	—	—	—	26	80
Civil	11	20	6	5	—	—	5	6	6	5	5	2	2	5	1	2	8	3	2	57	141
Electrical.....	5	10	10	2	—	—	3	2	7	3	—	3	4	1	3	5	—	—	—	27	85
Metallurgical	1	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	2	6	10
Industrial	—	—	—	2	—	15	—	2	—	—	1	—	—	—	—	—	—	1	2	5	28
Mechanical.....	22	26	10	10	6	19	4	3	5	1	6	1	3	5	6	4	1	—	3	36	181
Mining	15	—	—	—	—	—	—	3	—	1	—	1	—	—	—	—	—	1	—	6	27
Petroleum.....	14	—	—	—	—	—	3	5	—	1	—	2	—	—	—	1	—	4	—	30	60
Sanitary.....	—	—	7	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	10
Textile.....	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	6	7
Total	78	70	44	41	38	37	26	23	20	19	18	14	14	13	12	12	10	10	10	250	759

¹Degree-granting institution recognized in State of Michigan.

AGRICULTURE

Altogether, 107 students from Canada were studying agriculture in degree-granting institutions and universities in the United States during 1955–1956. Of these 26 were studying general agriculture, 41 agronomy, 31 husbandry and 9 food technology. The majority of the student body (77) were graduates.

More than two-thirds of the students came from the three provinces of Alberta, Ontario and Quebec. The geographical origin of the student body is shown below.

As the accompanying list shows, the province of origin was not stated in six cases: in one case the student, while a Canadian citizen, had gone to the United States not from Canada but from another country.

Canadian students of agriculture varied widely in age, although by far the largest number fell within the ages of 24 to 27. A considerable proportion of the students, however, were older. Altogether more than 15 per cent

of the total student body were either 30 years of age or over.

Male students, as might be expected, were in the vast majority; only six students were women.

Thirty-seven students, or rather more than one-third of the Canadian student body in agriculture, met their own educational expenses and were in other respects wholly self-supporting. The other two-thirds received financial support, at least to some extent, from various governmental or private agencies. Private organizations supported more than one-quarter of the student body. The various sources of financial support are shown below.

It is perhaps significant that of the students who received support, either wholly or partly, from private organizations, all but two were graduates engaged on more advanced courses of study.

The largest incidence of students in agriculture was at the University of Wisconsin, where 21 Canadian students were enrolled. Cornell University took second place with 20 students from Canada. Together these two universities

Province	Number
Newfoundland	2
Prince Edward Island	1
New Brunswick	1
Nova Scotia	4
Quebec	18
Ontario	26
Manitoba	4
Saskatchewan	8
Alberta	28
British Columbia	8
	<hr/> 100
Not stated	6
Outside Canada	1
	<hr/> 107

Source of Support	Number of Students
Private organizations	29
Self plus private organizations	14
Self supporting	37
U.S. Government	1
U.S. Government plus private organizations	2
Other governments	12
Other governments plus private organizations	2
	<hr/> 97
Source of support not stated	10
	<hr/> 107

accounted for 38 per cent of the Canadian student body in agricultural science.

Other universities or degree-granting institutions attended by Canadian students were, in order of numerical importance; the University of Minnesota, Brigham Young University, Utah State Agricultural College, the University of Washington, Montana State College, Pennsylvania State University, Iowa State College of Agriculture and Mechanical Arts, and the Massachusetts Institute of Technology.

In all, Canadian agricultural students attended some 32 different institutions in the United States during the period under review.

ARCHITECTURE

Forty-one students from Canada attended courses of instruction in architecture at various degree-granting institutions in the United States in the academic year 1955–1956. Only fifteen were graduates, a very much lower proportion of the student body than in agriculture.

Ontario was the home province of the largest single group of students. The composition of the student body by province is shown below.

As in agriculture, there was a fair degree of variation in the ages of Canadian students in architecture. Most students, however, were between 19 and 27 years of age. Thirty-eight of the students were men and three were women.

Most Canadian students in architecture met their own expenses of education at the various institutions they attended. Only seven received financial support,

either wholly or partly and as in agriculture, most of these were graduates. The following list shows the sources of financial support received by Canadian students in architecture.

In all, Canadian students in architecture in the United States attended some 20 different universities and degree-granting institutions. The largest concentrations of architecture students were at Harvard University (7), the University of Michigan (5), and the Massachusetts Institute of Tech-

nology (5). Among the other universities at which Canadian students were registered were the University of Washington and Columbia University.

Province	Number of Students
Nova Scotia	1
Quebec	4
Ontario	11
Manitoba	2
Saskatchewan	3
Alberta	9
British Columbia	5
	<hr/> 35
Not stated	6
	<hr/> 41

Source of Support	Number of Students
Private organizations	5
Self plus private organizations	2
Self supporting	29
	<hr/> 36
Source of support not stated	5
	<hr/> 41

VETERINARY MEDICINE

A small group of 12 Canadian students was studying veterinary medicine in the United States in 1955-1956. Five were from Ontario, two each from Alberta and British Columbia, and one each from Quebec and Manitoba. The age range of the group was fairly wide, as shown by the accompanying table.

The various sources of the financial support which was received by certain members of the group are shown below.

Nine different degree granting institutions were attended by Canadian students in the field of veterinary medicine, the largest enrolments being at Cornell University, the University of Minnesota and Ohio State University.

Age	Number of Students
Over 30	2
28	2
27	1
26	2
25	2
24	—
23	—
22	—
21	1
20	—
19	1
18	1

Source of Support	Number of Students
Private organizations	6
Self-supporting	4
Self plus private organizations	1
Government other than that of the United States	<u>1</u>
	<u>12</u>

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